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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,473	03/16/2004	Rocco DiFoggio	584-30656-US	1785

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EXAMINER	
SAINT SURIN, JACQUES M	

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 06/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/801,473	DIFOGGIO, ROCCO
	Examiner	Art Unit
	Jacques M. Saint-Surin	2856

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *4/14/05, 3/14/05, 3/16/04, 11/11/04,*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *32-69* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *32-69* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *09/14/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 32-69 are rejected under 35 U.S.C. 102(e) as being anticipated by Greenwood (US Patent 6,763,698).

Regarding claims 32, 46, 61-63 and 69, Greenwood discloses a method for estimating a property of a fluid (a system 20 for analyzing a property of fluid 25 is depicted, see: Fig. 1 and col. 3, lines 21-22), comprising:

transmitting a first acoustic pulse in a first member (surface 44) that is in contact with the fluid (a pulser 50 (Fig. 1) is electrically coupled to transducer 30 and is operable to deliver input stimulus signal to transducer 30 to cause transducer 30 to emit acoustic energy through solid member 40 and towards fluid 25, see: col. 3, lines 35-40);

detecting a plurality of acoustic pulse echo returns from an interface (member 42 would be the existing wall of a stainless pipe or container, see: col. 6, lines 20-21) between the first member (surface 44) and the fluid (transducer 30 is also operable to produce output signals in response to acoustic energy transmitted from member 40, see: col. 3, lines 39-40); and

estimating the property of the fluid from the plurality of acoustic pulse echo returns (processing apparatus 22 controls delivery of the transducer input signals, receives the output signals from transducer 30, and, as described more fully below, performs calculations to determine properties of fluid 25 as a function of the transducer output signals, see: col. 3, lines 43-47).

Regarding claim 46, as discussed above, it is similar scope with claim 32 and therefore is rejected for the reasons set forth for that claim. Furthermore, Greenwood

discloses a vessel (stainless pipe or container, see: col. 6, line 21) that contains fluid (25).

Regarding claims 61 and 69, as discussed above, they are similar in scope with claim 32 and therefore are rejected for the reasons set forth for that claim.

Regarding claim 62, as discussed above, it is similar in scope with claim 32 and therefore is rejected for the reasons set forth for that claim. Furthermore, Greenwood discloses a chamber (stainless pipe or container, see: col. 6, line 21) that contains fluid (25).

Regarding claim 63, it is similar in scope with claim 32 and therefore is rejected for the reasons set forth for that claim. Furthermore, Greenwood discloses the transducer 30 and solid member 40 are provided as a spool piece that is fixed in place in a pipeline. Considering the apparatus being used for analyzing fluids in a pipeline, it is inherently located downhole as recited in claim 60.

Regarding claims 33, 48 and 65, Greenwood discloses from the fluid specific reflection coefficient (RCfluid), computer 80 calculates the acoustic impedance of the fluid (Zfluid) and) from the acoustic impedance of the fluid (Zfluid), computer 80 calculates a physical property of the fluid. The density of the fluid (.rho.F) is calculated according to equation (4) where Vfluid is the speed of sound of the fluid, see: col. 4, lines 41-54.

Regarding claims 34, 49 and 66, Greenwood discloses In another form of the invention, because of the materials desired for solid member 40 and fluid 25, the acoustic impedance ratio Zsolid/Zfluid will be significant, for example, greater than

about 5 or 10. In this form, the ultrasound pulse is preferably detected as it undergoes a large number of reflections between surfaces 42 and 44 of member 40, for example more than about 10 reflections, preferably about 15-20 reflections. The multiple reflections serve to amplify the effect of small changes in properties of fluid 25. This amplification occurs because the amplitude of the pulse is diminished in accordance with the reflection coefficient (RCfluid) with each successive reflection with surface 44, see: col.6, lines 37-54).

Regarding claims 35 and 50, Greenwood discloses Zsolid is the acoustic impedance of the solid member 40, see: col. 4, line 46.

Regarding claims 36-40, 51-55 and 67-68, Greenwood discloses transducer 30 responds to the echoes by producing an output signal proportional to the echo amplitude that is amplified by receiver 60, digitized by digitizer 70 and passed to computer 80. Computer 80 includes programming instructions encoded on fixed and/or removable memory devices 84, 86, respectively, to select a peak echo amplitude for the series echoes and to determine the average decay rate of the peak echo amplitudes with increasing echo number in the echo series. Alternatively, computer 80 can be at least partially hard wired with dedicated memory devices and configured to execute logic according to the present invention. Computer 80 is operatively coupled to display 82 to output selected information about fluid 25 integrated with transducer 30. Preferably a number of echo amplitudes, for example 5 or more, spanning a range of echo numbers are used in computing the decay rate. In

one preferred form, computer 80 is programmed to first compute the fast Fourier transform (FFT) of the digitized signal, converting it from the time domain to the frequency domain and then determine the peak amplitude at a selected frequency, where the frequency is selected to be, for example, the center frequency of transducer 30. In a still further preferred form, the process is repeated for a number of pulses from transducer 30, and the average decay rate of the peak echo amplitudes is determined for each repetition. A rolling average of the resulting set of average decay rates is then determined. The determined average decay rate can be expressed as the slope of the line of the natural log of echo amplitude versus echo number (.DELTA.F). An exemplary plot of log echo amplitude versus echo number with a line fit to the exemplary data is shown in FIG. 8 (see: col. 3, lines 59-67 and col. 4, lines 1-22).

Regarding claims 41 and 56, Greenwood discloses a time-of-flight measurement is accomplished by measuring the time it takes an ultrasound pulse to travel a known distance through the fluid 25.The speed of sound (Vfluid) is then determined by dividing the known distance by the determined transit time. FIGS. 2 and 3 schematically illustrate devices 102 and 104 for performing time-of-flight measurements that can form a portion of system 20. In the FIG. 2 embodiment, a pair of transducers 110, 112 are arranged in pitch-catch mode and measure the time it takes sound to travel from transducer 110 to transducer 112, see: col. 4, lines 59-67 and col. 5, line 1.

Regarding claims 42-43 and 57-58, Greenwood discloses because the ultrasound travels through the fluid in a time-of-flight measurement, it is preferred to use a lower frequency of ultrasound in the time-of-flight measurement than in the echo measurement to minimize attenuation of ultrasound in the fluid during the time-of-flight measurement, see: col. 5, lines 5-10. Regarding claims 43 and 58, Greenwood discloses the time-of-flight measurement is performed at a frequency below 1 MHz

Regarding claims 44 and 59, Greenwood discloses transducers useful for forming and receiving the ultrasound pulse echo series in practicing the present invention can operate in the range of about 0.5 to 20 MHz, more preferable between about 1 and 10 MHz, and most preferably about 5 MHz, see: col. 6, lines 11-15. Greenwood further teaches the ultrasound pulse is a broadband pulse, see: col. 2, line 17 and col. 4, lines 8-13.

Regarding claims 47 and 64, Greenwood discloses pipe 140 as shown in Fig. 5.

Regarding claim 60, Greenwood discloses the transducer 30 and solid member 40 are provided as a spool piece that is fixed in place in a pipeline. Considering the apparatus being used for analyzing fluids in a pipeline, it is inherently located downhole as recited in claim 60.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Greenwood (US Patent 6,877,375) discloses a system and technique for characterizing fluids using ultrasonic diffraction grating spectroscopy.

Warner et al. (US Patent 5,341,345) discloses ultrasonic stand-off gauge.

Han et al. (US Patent 6,672,163) discloses acoustic sensor for fluid characterization.

Welkowitz (US Patent 2,959,054) discloses ultrasonic flowmeter.

Mcskimin (US Patent 2,968,058) discloses a measurement of dynamic properties of materials.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacques M. Saint-Surin whose telephone number is (571) 272-2206. The examiner can normally be reached on Mondays through Fridays 10:30 A.M. -7:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272 2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jacques M. Saint-Surin
June 22, 2005

HEZRON WILLIAMS
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